Johnson 1993b

**STREAM:** Bear Creek

**DRAINAGE:** West Fork Jarbidge River

**STATE WATER CODE:** 1020

**GAWS COMPUTER NO.:** 170501,05,155,035,050

**SURVEY DATES:** June 9,10,11,16 and 17, 1992

**REPORT DATE:** March 4, 1993

**WRITTEN BY:** Gary Lee Johnson

**SURVEY METHODOLOGY:** The U.S. Forest Service Region 4, Level III Fisheries Habitat Survey Method (March, 1989) was utilized at seven Sample Sites (SS) spread somewhat equidistant throughout the 4.3 mi. length of stream. Each SS was preplotted on the U.S. Geological Survey 7.5 min. topographic maps of the area.

The first 100 ft. at each SS was sampled for fish using a one-pass effort with a Dirigo backpack electroshocker. Stunned fish were netted and held for fork length (mm) and weight (gm) measurement and general body condition assessment prior to their return to the stream. Fish seen escaping capture were recorded as misses and used in fish density estimate calculations. Aquatic macroinvertebrate types and relative abundance were assessed following random stream and substrate inspection at each SS. Habitat transects were placed 50 ft. apart. Stream discharge was calculated for each SS using timed float, velocity estimates and water width and depth measurements over a 1-2m length of uniform stream.

**LAND OWNERSHIP AND ACCESS:** The entire Bear Creek drainage lies within the Jarbidge District of the Humboldt National Forest. The lower approximate 0.2 mi. of Bear Creek lie within the boundaries of Jarbidge town. Jarbidge is about 102 mi. N-NE of Elko on roads subject to closures during periods of snowpack. It is common to have snowdrifts block access over mountain passes well into June during normal snowfall years. The upper mile stream known as Bear Creek Meadows is accessible off the main access road. The lower 0.5 mi. stream within Jarbidge is also accessible from a road. The remainder of stream is situated in a steep fluvial valley and thus, only may be entered on foot.

**WATERSHED DESCRIPTION:** Bear Creek is a northerly flowing stream within a 3.0 sq. mi. drainage on the western side of the Jarbidge Mountains. Basin elevation ranges from 9028 ft. at the head of the basin divide to below 6200 ft. in the town of Jarbidge. The lower three SS were situated in a narrow to moderate V-shaped valley averaging 52 ft. wide. The two middle SS were of the same valley type with a valley bottom averaging 18 ft. wide. The two SS within Bear Creek Meadows were of a low V-shape valley form with a valley

width ranging from 49 ft. to 180 ft.
Upland vegetation within the drainage consisted primarily of fir, mountain shrub and aspen surrounding Bear Creek Meadows and a mixture of fir, aspen, mountain mahogany, and mountain brush in the canyon. Understory vegetation appeared to be dominated by forbs. The parent geology of the drainage is upper volcanic rocks of which were variously seen as outcrops and rock slides (One-million Scale Geologic Map of Nevada, 1977).

**WATER STATUS:** Bear Creek was a gaining stream that went from 0.32 cfs to 1.38 cfs. Stream runoff was described as being "low". The Soil Conservation Service snow survey data for Bear Creek Meadow on May 1, 1992 showed the site was without snow whereas, there was snow at the site in six previous dry years. There was a side tributary inflow in T46N R58E Section 20 NE¼ and additional inflows within Bear Creek Meadows. There is a water diversion for the town of Jarbidge located at road's end and above SS-1 that could substantially reduce streamflow below the diversion dam.

Stream temperature ranged from a morning low reading of 44°F to an afternoon high reading of 58°F. Water clarity was recorded as clear at all SS. The stream Ph was 6.5 and alkalinity was about 17 ppm at SS1-1 on June 17, 1992. The stream width to depth ratio averaged 40.0 in the canyon (Reach 1) and 14.1 in Bear Creek Meadows (Reach 2).

**STREAM HABITAT CONDITION INDEX (HCI):** The overall, stream HCI was 76.3 percent of optimum or "good". Reach 1 and Reach 2 had HCI ratings of 78.5 and 70.7, respectively. The lowest rated individual HCI parameter was pool structure wherein, the mean rating was 47.4 percent of optimum. Similarly, the mean pool structure rating through fish sample areas was 53% of optimum. Bank cover percent of optimum were "good" to "excellent" at the three lowest elevation SS's where shrubs and trees were present. Understory plants dominated the bank cover at the upper three SS's which equated to a "fair" rating as did a mixture of trees and rock at SS1-4.

**STREAM CHANNEL TYPE AND STABILITY:** The lower canyon portion of stream (SS1-1 through SS1-3) was characterized by a gradient ranging from 7-10% and a streambottom dominated by rubble (58%) and lesser amounts of gravel (17%), boulder (15%) and sand/silt (10%). In the upper canyon area the gradient ranged from 11.5-21.5% and dominant substrates were rubble (34%), boulder (31%) and gravel (29%) at SS1-4 and gravel (43%), rubble (32%) and boulder (17%) at SS1-5. The channel within the canyon was deemed a Rosgen's A2/A3 channel type. The channel within Bear Creek Meadows was more sinuous, a gradient of 4.0-5.5% and primarily gravel/rubble substrate. A Rosgen's B6 channel probably best fits the type of channel within the meadow. Stream channel stability evaluations all rated "good" with a stream average of 66.6.

**RIPARIAN CONDITIONS:** Alder and some willow dominated riparian overstory vegetation at SS's within the canyon. Other associated

species included fir trees, aspen and some chokecherry (SS1-1). Understory plants were primarily tall forbs in Reach 1. Riparian vegetation in Bear Creek Meadows was composed of forbs (primarily Veratrum californicum) and sedges. There was some low willow in the meadow as well. All riparian zones scored in "good" condition. Streamside cover provided the water a mean canopy of 66% in the canyon and only 13.5% in the meadow.

**HABITAT VULNERABILITY:** The Index of Habitat Vulnerbility (HVI) to management activities was "moderate" at only SS1-4 and "high" at all other SS's. Streambank sensitivity ratings as determined from the combined stream channel stability scores for upperbank vegetative protection and lowerbank rock content averaged a score of 10 (8-12). A score of >13 indicates that one season of moderate livestock grazing can result in damaged streambanks. No ungulate streambank damage was present in Reach 1 and only a slight amount of damage (5.0%) was found at SS's in Reach 2. Bear Creek drainage is excluded from permitted livestock use by the U.S. Forest Service. Average undercut streambank frequency at habitat transect sites was 34% in the canyon and 80% in the meadow. Streambottom embeddedness ratings were "light" throughout the stream.

**FISH POPULATION:** Rainbow/redband trout were captured only at SS1-2 and SS1-3 at densities of 52.8 fish/mi. and 475.2 fish/mi., respectively. Stream gradient is probably limiting the upstream distribution of fish. The water withdrawal above SS1-1 could prohibit fish occupancy downstream of the point of diversion. Hence, trout may only occupy about 1.4 mi. of stream. Sampled trout fork length averaged 82.2 mm (44-103). Length frequency indicates that there were at least two age-classes in the sample population. Personal communication with Jarbidge resident, Dave Williams indicated that he had transplanted wild trout salvaged from Deep Creek (Bruneau River Drainage) to Bear Creek in 1987.

The only previous recorded fish population work completed on Bear Creek was done at one 100 ft. length of stream in the meadows on August 22, 1963. Electrofishing resulted in the capture of one eight-inch brook trout. Brook trout were also caught by anglers in the meadows in 1962 and 1963. While there are no records of fish having been stocked in Bear Creek, there were brook trout stocked in the Jarbidge River every year from 1956 through 1959. Brook trout would have had to have been stocked in Bear Creek Meadows.

**AQUATIC FAUNA AND FLORA:** Caddisflies were found throughout the length of stream however, there were only two types at SS1-1 and a scant few of them. Elsewhere in the stream, caddisflies were common to abundant with from two to six types found at each SS. The second most widely distributed aquatic invertebrates were mayflies wherein, they were occasional (two types present) or common (three types present) at SS's excluding SS1-1. Planaria had the same distribution as mayflies and were occasional to abundant. Stoneflies were rare to common at three SS's. Earthworms were rare to common in the meadows and aquatic dipterans occasional (two types) at SS1-2 and rare at two other

SS's. Algae was present at very low densities at most SS's. The streambottom at SS1-1 had a scum coating which provided poor habitat for invertebrates.

**BEAVER STATUS:** There was no past or present evidence of beaver activity in the Bear Creek drainage nor was there any suitable habitat due to limited forage/steep stream gradient.

## CONCLUSIONS

**STREAM'S IMPORTANCE:** Bear Creek is a water source for the town of Jarbidge. A limited wild rainbow/redband trout population exits in a portion of stream.

**ISSUES AND CONCERNS:** The lower 0.5 mi. of stream appeared to have streambottom precipitate leaving the area unsuitable for aquatic insect and fish production. Nevada Department of Environmental Protection was notified of possible water quality problems and their July 8, 1992 water samples taken from Bear Creek at the confluence of the West Fork Jarbidge River yielded no water quality problems.

**RECOMMENDATION:** Bear Creek Meadows might be capable of providing habitat for bull trout if it becomes necessary to expand their current range to benefit the species.